Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at http://about.jstor.org/participate-jstor/individuals/early-journal-content.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

338. Proposed by RICHARD LOCHNER, Philadelphia, Pa.

An elliptical field has a major axis of 100 feet and a minor axis of 10 feet. A cow is tethered at the end of the major axis and another at the end of the minor axis. If each cow can graze over half the field, how long is the rope of each? What is the area of the portion over which the cows can graze in common?

MECHANICS.

274. Proposed by G. B. M. ZERR.

A sphere moves on the concave side of a rough cylindrical surface of which the transverse section perpendicular to the generating lines is a hypocycloid. If $s = l \sin n\theta$ be the intrinsic equation of the hypocycloid, then $l = (a - b)4b/a$, $n = a/(a - 2b)$, where a = radius of fixed circle, b = radius of rolling circle.

275. W. J. GREENSTREET, Editor Mathematical Gazette, England.

If a particle be attracted towards the angular points of a regular hexagon by forces equal to r^{-h}, at distance r, find the condition for stability of equilibrium.

NUMBER THEORY AND DIOPHANTINE ANALYSIS.

190. Proposed by H. C. FEEMSTER, York, Neb.

Show that, if n is a prime number and r is an integer less than n, then

$$|\underline{r-1}\;\;|\underline{n-r} + (-1)^{r-1} = M \cdot n,$$

where M is an integer.

SOLUTIONS OF PROBLEMS.

ALGEBRA.

376. Proposed by W. W. BEMAN, Ann Arbor, Mich.

If

$$\left(1 + \frac{1}{m}\right)^m \Big/ e = 1 - a_1 \frac{1}{m} + a_2 \frac{1}{m^2} - a_3 \frac{1}{m^3} + \cdots,$$

prove that

$$na_n = \sum_{k=1}^{k=n} \frac{k}{k+1} a_{n-k}$$

and compute $a_1, a_2, a_3, \cdots, a_8$.

SOLUTION BY THE PROPOSER.

For convenience, put $1/m = x$, and $y = (1 + x)^{1/x}/e$. Then

$$ey = (1 + x)^{1/x},$$

$$\log y = -\frac{x}{2} + \frac{x^2}{3} - \frac{x^3}{4} + \cdots$$

and

$$\frac{y'}{y} = -\frac{1}{2} + \frac{2x}{3} - \frac{3x^2}{4} - \cdots.$$

Assume

$$y = 1 - a_1 x + a_2 x^2 - a_3 x^3 + \cdots.$$

Then

$$\begin{aligned} y' &= -a_1 + 2a_2 x - 3a_3 x^2 + 4a_4 x^3 - \cdots \\ &= \left(1 - a_1 x + a_2 x^2 - a_3 x^3 + \cdots\right)\left(-\frac{1}{2} + \frac{2x}{3} - \frac{3x^2}{4} + \cdots\right). \end{aligned}$$